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ONR FINAL REPORT

FURTHER DEVELOPMENT AND FIELD OF TESTING OF A SOFAR FLOAT SYSTEM FOR FUTURE ARCTIC OCEAN MEASUREMENTS Contract Number N000-14-89-J-1213

(W. B. OWENS, Principal Investigator)

Program Accomplishments

This contract funded a collaborative effort, with T. Manley, Lamont-Doherty Observatory, and J.-C. Gascard, University of Paris, to deploy SOFAR floats in the Arctic Ocean to develop the capability of making Lagrangian measurements under sea ice. This involved the design and manufacture of floats that operated at both 80 and 260 Hz and drifting listening stations that receive the float signals and transmit their arrival times to shore using ARGOS. Unfortunately, the results of these tests suggest that the ranges for signals using the simple swept frequency algorithm for SOFAR floats are sufficiently short that an alternate system will have to be developed.

In September, 1988 two 80 Hz and one 260 Hz float and two listening stations were deployed from the USCG Icebreaker NORTHWIND as part of the CEAREX experiment. An additional five floats four listening stations were deployed in March, 1989 from the CEAREX ice camp. Unfortunately these low frequency floats did not provide ranges as large as we expected, and we were unable to track these floats. Two likely causes for this problem are low acoustic output from the floats and the higher than expected losses of the signal as it reflected off the bottom the sea ice. Combined with earlier tests which gave similar results for higher frequencies, this suggests that the float signaling scheme, a linear swept frequency coding, is more susceptible to bottom scattering than expected. Qualitatively, the range appears to be independent of frequency and basically can sustain only a small number of refractions from the under surface of the ice.

Under this contract we also supported Manley and Gascard's float deployments south of Fram Strait, both in the preparation of floats and in the processing of the data from moored listening stations to produce trajectories. The data clearly shows significant recirculation of the Atlantic Water south of Fram Strait. Gascard is taking the lead in publishing these results.

cc: Dr. Thomas B. Curtin, Program Manager (3)
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